

Matt Blunt, Governor • Doyle Childers, Director

DEPARTMENT OF NATURAL RESOURCES

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SUPERFUND DIVISION

June 24, 2005

Mr. Mark Falloon
City Administrator
210 West Washington
Sullivan, MO 63080

Dear Mr. Falloon:

Enclosed is a copy of the results from the Passive Vent Investigation conducted on the closed Sullivan Landfill by the Missouri Department of Natural Resources on June 15, 2005. The investigation was conducted as part of the Oak Grove Village (OGV) Well Site Remedial Investigation/Feasibility Study (RI/FS).

Personnel from the Hazardous and Solid Waste Management Programs monitored fifteen of the sixteen passive vents to determine the effective removal of methane from under the landfill's cap. Based on the monitoring results, it appears the landfill's passive venting system may not be functioning as designed.

As you may recall, the Hazardous and Solid Waste Management Programs were previously involved with construction activities related to the closed Sullivan Landfill, especially the passive venting system and the cap. We are requesting your permission to further investigate the closed Sullivan Landfill to determine the current decomposition processes, especially the methanogenic process.

The field activities will be conducted from July 5 through 7, 2005 and July 18 through 20, 2005. We would like to Geoprobe and sample within and around the landfill. The Geoprobe activities will pass through the existing cap, and upon completion of each boring, the hole will be properly closed with a bentonite-cement slurry mix to maintain the integrity of the cap. The information obtained should provide current extent, location, and composition of the wastes, leachate, and gas.

The Benham Companies, our consultant, is currently using a key lent to them by Mr. Tom Harman for access to the landfill. If possible, we would like to continue to use the key until these activities are completed. The key will then be returned.

Also, there is a good vegetative growth upon the landfill. Would it be possible mow and/or bail the growth before field activities begin?



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If you have any questions regarding the results or about the progress of the investigation at the Oak Grove Village Well Site, please contact me at (573) 751-1738 or in writing at the Missouri Department of Natural Resources Hazardous Waste Program, P O. Box 176, Jefferson City, Missouri 65102-0176

Sincerely,

HAZARDOUS WASTE PROGRAM

Candice McGhee

Candice McGhee
Project Manager

CM.cc

Enclosures

c: Mr. Arthur Busch, Department of Health and Senior Services
Mr. Frank Dolan, Solid Waste Management Program
Mr. Kurt Hollman, Geological Survey and Resource Assessment Division
Ms. Tonya Howell, Environmental Protection Agency
Mr. Bert Smith, The Benham Companies, LLC
Ex. 6 [REDACTED]

bc: Mr. Aaron Schmidt, Hazardous Waste Program/Resource Conservation & Recovery Act

**Results of Landfill Gas Passive Vent Investigation, Sullivan Landfill, Sullivan, Missouri
Conducted on June 15, 2005 by Michael Flach (SWMP) and Candice McGhee (HWMP)**

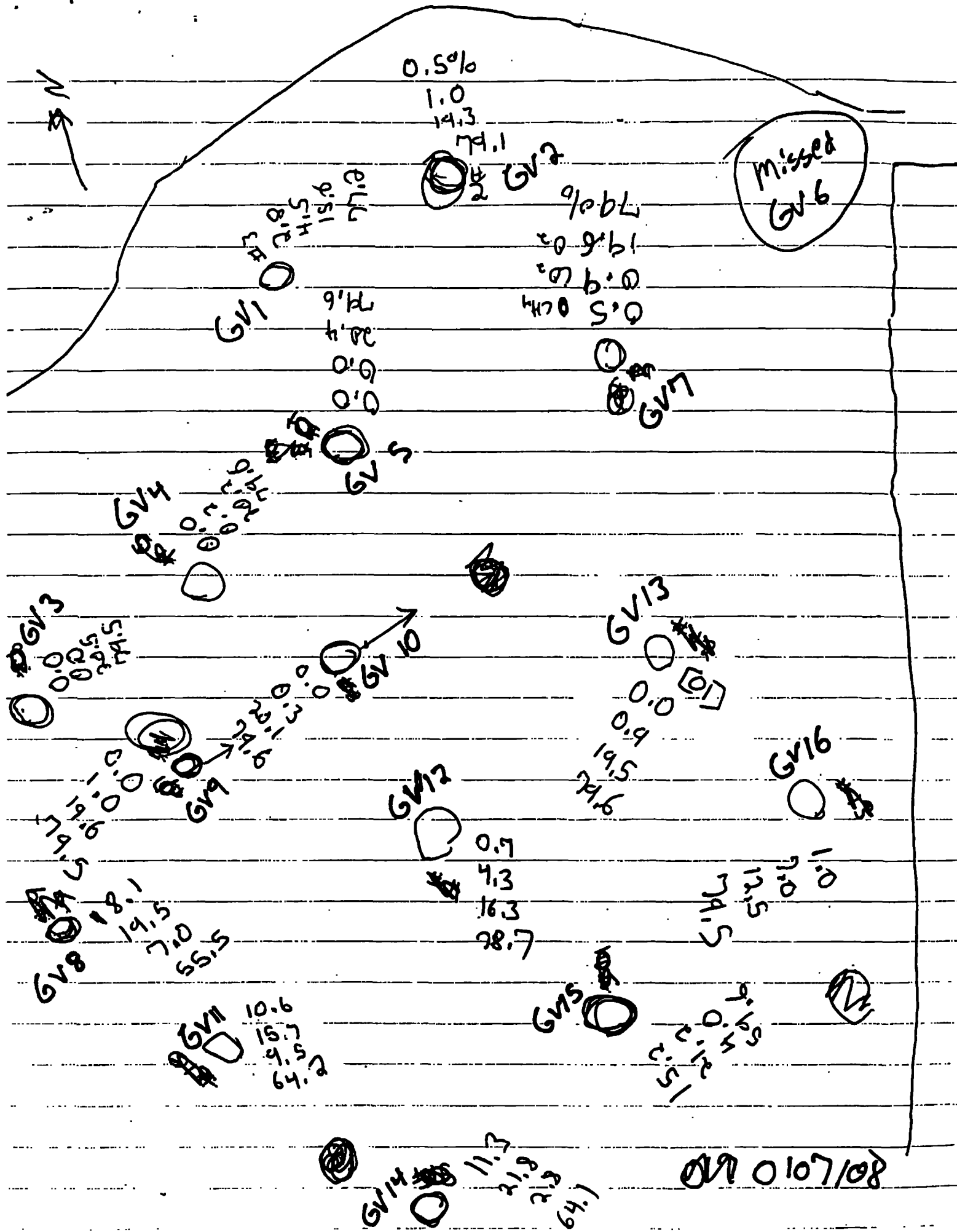
The Sullivan Landfill (Permit # 0107108) located in Sullivan, Missouri utilizes a passive vent system to remove landfill gas from an unlined pre-subtitle D landfill cell. The venting system consists of sixteen 4-inch diameter polyethylene pipe risers spaced in a grid pattern at approximate 200-foot intervals. The risers penetrate a final cover layer that consist of a 6 inch vegetative soil layer, a 12-inch sand drainage layer, a 40-mil VLDPE Geomembrane, a 18-inch hydraulic barrier soil layer (consisting of native clay), a 12-inch gas collection layer consisting of sandy soil, and a subgrade fill layer consisting of native soil. The passive vents do not appear to extend into waste.

On June 15, 2005 an investigation was conducted to determine methane levels in the individual passive vent riser (GV-1 to GV-16). Program personal utilized a CES Landtech Gem 2000 landfill gas analyzer to monitor 15 of the 16 passive vents for methane. Gas vent 6 was missed by the sampling team and therefore not monitored. At the request of Candace McGhee, three groundwater wells associated with the site were also checked for the presence of methane. Results of the investigation are show in the following table:

Landfill Gas Passive Vent Monitoring Results for the Sullivan Landfill

Vent ID	Date	CH ₄	CO ₂	O ₂	Balance
GV-1	6/16/2005	2.8%	4.5%	15.6%	77.2%
GV-2	6/16/2005	0.5%	1.0%	19.3%	79.1%
GV-3	6/16/2005	0.0%	0.0%	20.5%	79.5%
GV-4	6/16/2005	0.0%	0.2%	20.2%	79.6%
GV-5	6/16/2005	0.0%	0.0%	20.4%	79.6%
GV-6	Not Monitored				
GV-7	6/16/2005	0.5%	0.9%	19.6%	79.0%
GV-8	6/16/2005	18.1%	19.5%	7.0%	55.5%
GV-9	6/16/2005	0.0%	1.0%	19.6%	79.5%
GV-10	6/16/2005	0.0%	0.3%	20.1%	79.6%
GV-11	6/16/2005	10.6%	15.7%	9.5%	64.2%
GV-12	6/16/2005	0.7%	4.3%	16.3%	78.7%
GV-13	6/16/2005	0.0%	0.9%	19.5%	79.6%
GV-14	6/16/2005	11.3%	21.8%	2.8%	64.1%
GV-15	6/16/2005	15.2%	21.2%	4.0%	59.6%
GV-16	6/16/2005	1.0%	7.0%	12.5%	79.5%
Flying J Deep Well	6/16/2005	0.0%	0.0%	20.9%	79.2%
VFW Well	6/16/2005	0.0%	0.0%	20.8%	79.2%
Sullivan LF Well	6/16/2005	0.0%	0.0%	20.8%	79.2%

Based on the data collected on June 15, 2005 by the investigation team, it appears that the passive venting system at the Sullivan Landfill is not effectively venting methane from the waste located on site. The majority of the passive vents (66%) showed no significant methane venting from them. The passive vents that did show some methane are all located in the Southwest portion of the Sullivan Landfill, where the old ravine fill area and sinkhole are located.



0107/08

Flying J deep well 6/15/05 1145

0.0 CH₄

0.0 CO₂

20.9 O₂

79.2 Balance

VFW Well 0.0 CH₄ 6/15/05 1150

0.0 CO₂

20.8 O₂

79.2 Balance

Sullivan LF Well 6/15/05 1203

0.0

0.0

20.8

79.2

Send geocaching
website to
Candace McGee

being prepared and will be available prior to final design. The final grades presented in Appendix A will be re-evaluated during the final design phase based on the new mapping.

3.1.1 Final Cover Description

This subsection describes each cover system component. Figure 3-1 illustrates a typical cross-section of the final cover system.

Subgrade Fill. Subgrade fill soil will be placed to fill existing surface depressions and to promote surface water runoff. The subgrade fill will consist of locally available native soil.

Gas Collection Layer. A 12-inch layer of sandy soil will be placed as a gas collection layer above the subgrade fill. Gases migrating through the gas collection layer will be vented to the atmosphere through the hydraulic barrier. The gas collection layer, along with the subgrade fill layer, supports the hydraulic barrier layer.

Gas Venting System. A gas venting system will be included to remove landfill gases from beneath the hydraulic barrier layer. The gas collection layer and venting system is designed as a passive system, and includes 4-inch diameter polyethylene pipe risers that will penetrate the geomembrane and extend vertically above the surface of the Landfill cover system. The risers will be spaced in a grid pattern at approximate 200-foot intervals and will vent accumulated landfill gases. A typical cross-section of the gas venting system is shown in Figure 3-2.

Composite Hydraulic Barrier Layer. The primary hydraulic barrier will be a 40-mil very low density polyethylene geomembrane. An 18-inch-thick, low-permeability soil layer consisting of native clay will be placed beneath the geomembrane. The clay layer will act as a secondary barrier to prevent infiltration of water into the waste. The native clay will be compacted to achieve a hydraulic conductivity of not more than 1×10^{-6} centimeters per second (cm/sec).

Drainage Layer. A 12-inch sand drainage layer will be placed above the geomembrane to promote lateral drainage and minimize accumulation of water above the geomembrane. This soil material will have a hydraulic conductivity of 1×10^{-2} cm/sec. The drainage layer will discharge via piped outlets into drainage

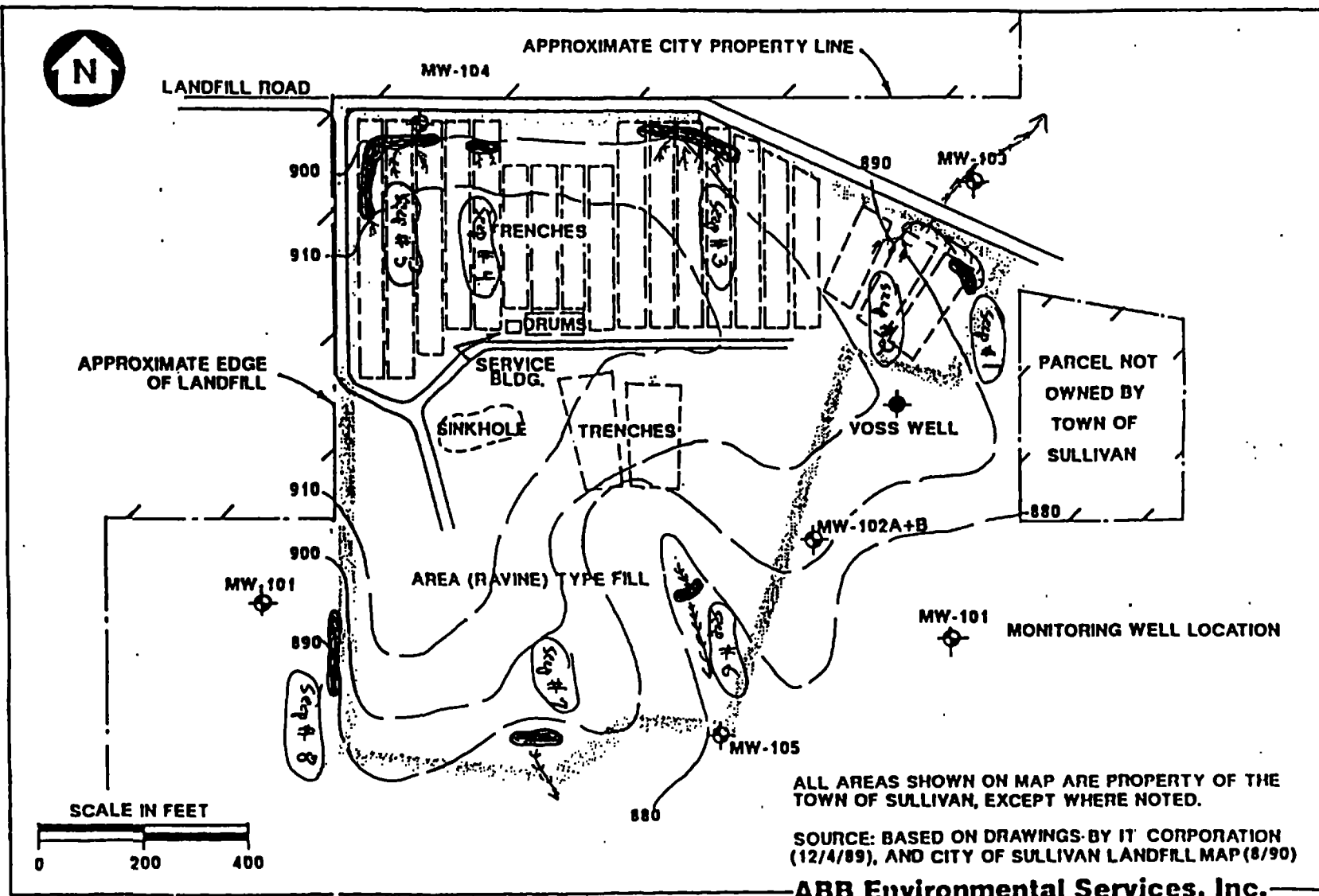
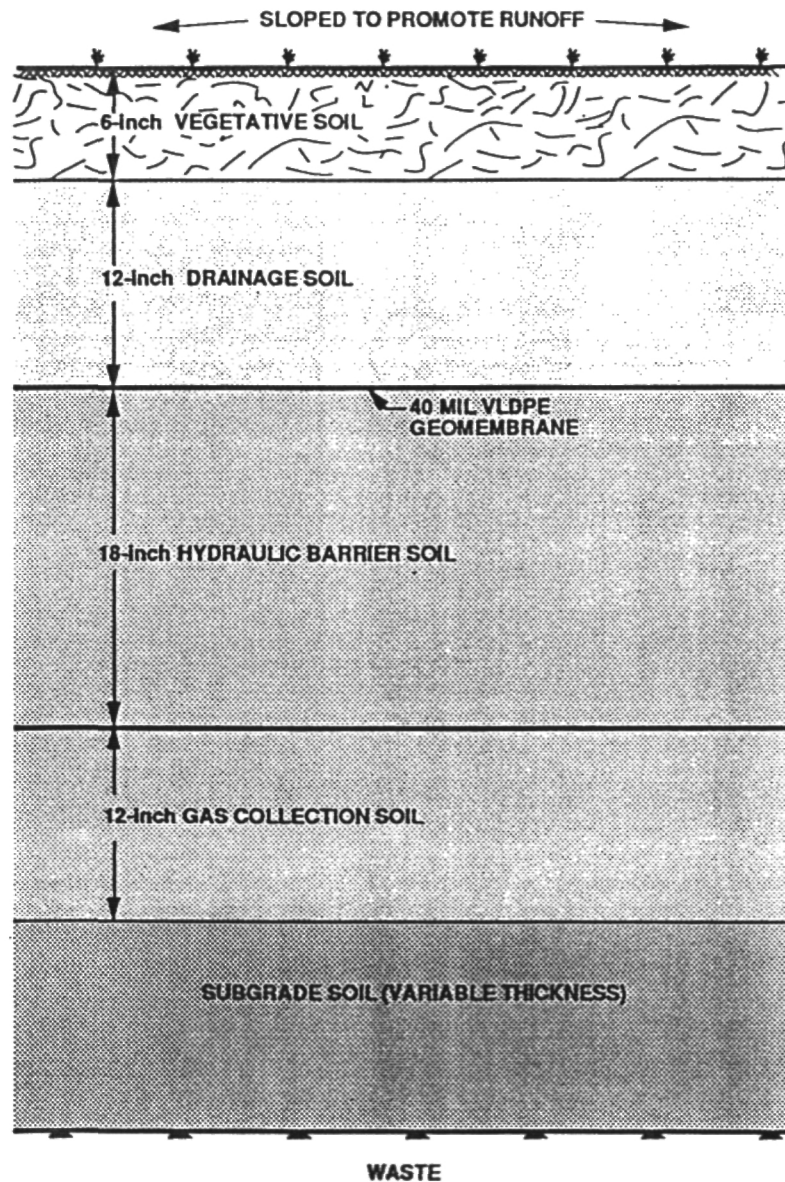


Figure 2-1: Groundwater Monitoring Locations, Sullivan Landfill Site, Sullivan, Missouri

Methane will travel either upward, if it is not hindered in some way, or it will travel laterally under pressure. If gas is trapped within the landfill and cannot escape upward, it will build up pressure until it is forced out, always by the route of least resistance. Passive vents in a cap may not always provide the easiest route for gas to travel.



NOT TO SCALE

ABB Environmental Services, Inc

Figure 3-1: Final Cover System

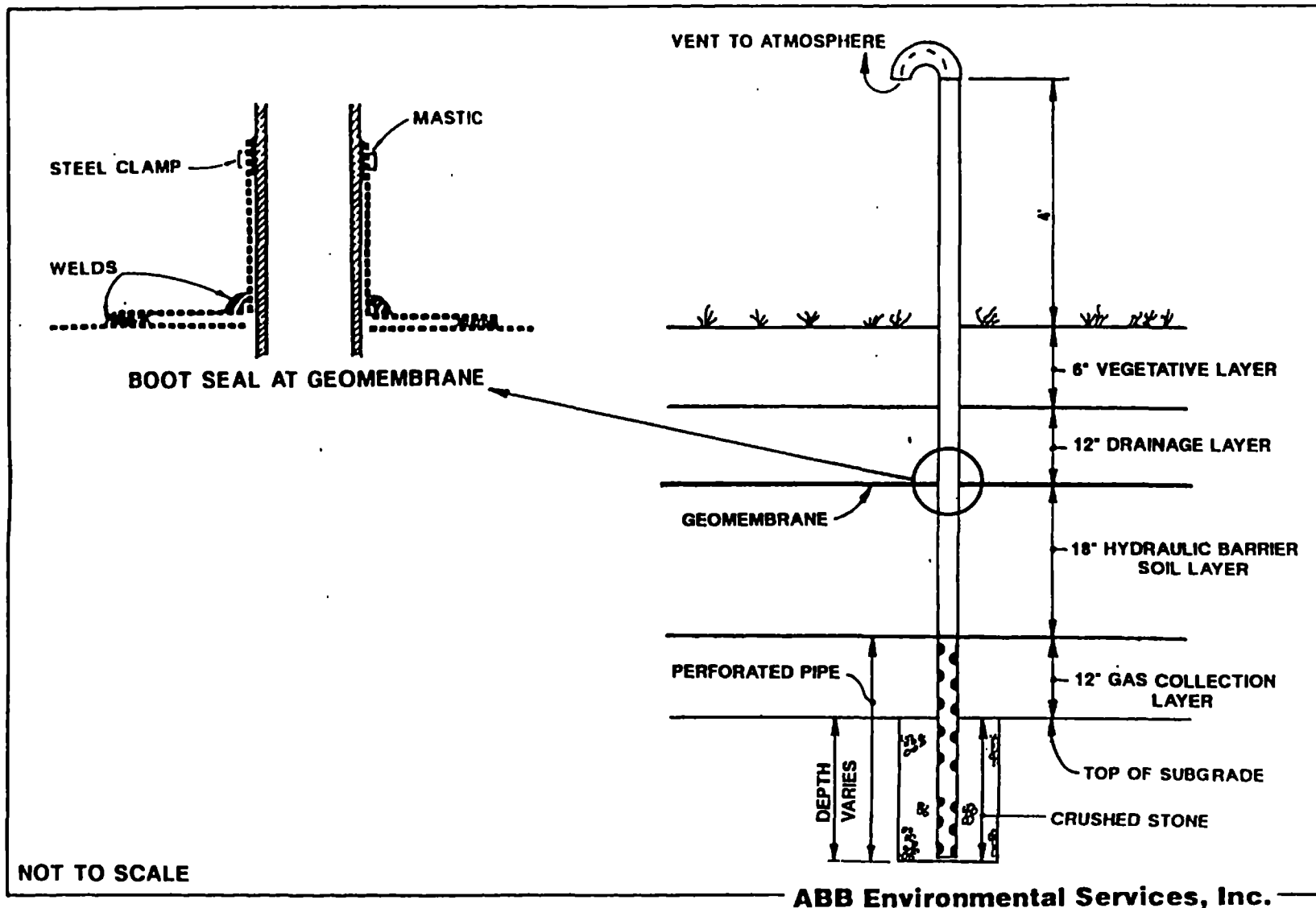


Figure 3-2: Typical Cross Section Of Gas-Venting System,
Sullivan Landfill Site, Sullivan, Missouri